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RECONSTRUCTION OF PAST CLIMATIC VARIABILITY

Harold C. Fritts, et al

Arizona University

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In the first half of Year Two in the project "Reconstruction of Past Climatic Variability," the following have been the major accomplishments:

1) Processing of tree-ring data already collected, bringing the total number of chronologies available for climatic reconstruction to 56.
2) Collecting in eastern United States and in Alaska, including a major trip into the Mississippi drainage region which added 23 new sample sites and updated the older University of Chicago collection.
3) Compiling climatic data which will be used to calibrate tree-ring data.

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SUMMARY (non-technical)

The first half of Year Two in the project "Reconstruction of Past Climatic Variability" has been characterized by progress in the processing of tree-ring data already collected and by important new collections made in eastern United States and in Alaska. Two additional noteworthy accomplishments have been made: 1) Compilation and tentative evaluation of climatic data which will be calibrated with tree-ring data for climatic reconstruction, and 2) The perfecting of the computer program essential for evaluating non-exponential growth curves in tree-ring data.

A major collection trip into the Mississippi drainage region added 23 new sample sites, several of which will update older collections acquired from University of Chicago. These plus other materials from Alaska, New York State, and Sweden are to be added to our network of tree sites for climatic calibration and reconstruction.

A total of 45 new chronologies have been dated; of these, 19 chronologies have reached computer processing, and 6 new chronologies have been fully processed. This places the total number of tree-ring chronologies available for climatic reconstruction analysis at 56, over and above the 49-station grid already developed for western North America.

A trip was made during October, 1973, which has established lines of communication and collaboration with dendrochronologists and climatologists in France, Poland, and the Soviet Union. It is hoped that data will become available through these international contacts and we will be able to expand our tree-ring stations into these countries.

INTRODUCTION

December, 1973, marks a stage in the "Reconstruction of Past Climatic Variability" project at which a significant number of tree-ring chronologies have been successfully collected, dated, and are in the last computational processing. This shows considerable adherence to the overall plans for the project (Table 1, items 1, 2, and 4), as the data from these chronologies should all be available by the target date of June, 1974. (See reports for Task 1, 2, and 3a.) As anticipated, a sufficient number to cover North America will require at least three additional years of work.

A tentative grid of climatic stations to be used in reconstruction analyses has been prepared (see report for Task 4). The technique for evaluating the multivariate models to be employed in the analyses is being developed and we see no reason why it will not be operable when enough tree-ring data are available for a first analysis effort.

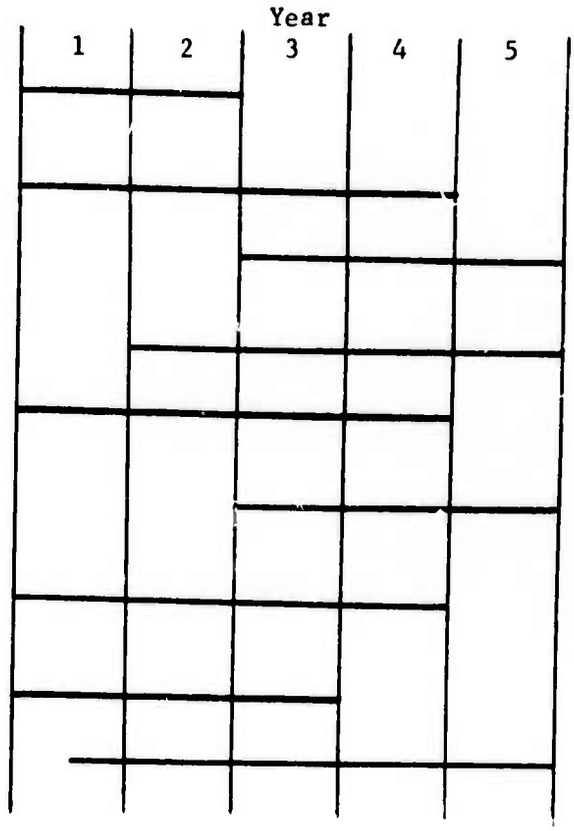
Phase 2 of climatic reconstructions (Table 2 in the first proposal), which will use the expanded continental dendrochronologic data base as it becomes completed, will be initiated in the latter part of this year or in the third year, constituting a new Task status. Having obtained the results of efforts in Phase 1 and 2 reconstructions, we shall be in a better position to determine what areas of more intensive dendrochronologic or climatologic coverage are needed for greater accuracy and resolution in our predictions of past climate.

Continued progress on the developing international cooperation is reported, and data contributed by Europeans are beginning to come in.

Detailed progress reports of each task force follows, reported by the individuals responsible for each facet of the program. Tables showing additional collections and further progress on collections previously reported are included.

TABLE 1. TIMING OF DATA COLLECTION AND ANALYSIS (Arizona)
(From Proposal of June, 1972)

1. Collect and process ring data from western North America
2. Collect and process data from other areas in North America
3. Process collections for density data
4. Collect and sample ring data from other countries
5. Collect historical information
6. Interpret tree-ring and all other information, including pollen data
7. Development of multivariate and other models
8. Calibrate and relate actual climatic anomalies to synoptic situation
9. Reconstruct past climate



DETAILED TASK REPORTS

Task 1 reported by M. A. Stokes. Collections in Mexico and Sweden.

Examination of the sites collected in Baja California, Mexico, during May of 1973, has proceeded with a minor degree of dating difficulty in some areas, and with more ease than anticipated in Sierra San Pedro Martir. Seven chronologies have been carried through the cross-dating procedure (Table 2). By December, 1973, we began measuring two Baja sites. An additional long-term chronology from the Sierra Madre, Chihuahua, has been made available to the project and is listed in Table 2.

New material from a previously inadequately sampled site in Sweden has been provided by Dr. Bengt Jonsson. These additional cores significantly increase the reliability and length of the chronology last reported.

We anticipate that the total Task 1 collections should be completely processed and ready for use within the next six months. The 14 chronologies completed through data processing as of the last semi-annual report have been omitted from this tabulation.

TABLE 2
Progress of Task 1. Collections in Mexico and Sweden.

SPONSOR	SITE NAME	SPECIES	CORES/ TREES	EXAMINED	DATING CHECKED	CHRON. LENGTH	MEASURED	DATA PROCESSED	SELECTED CORES/TREES
ARPA	Baja/N/Topo	JP	50/25	*	*	1616-1972			
ARPA	Baja/N/Pond	Pnnq	58/29	*	*	1658-1960			
ARPA	Baja/C/San Pedro Martir-L	JP	46/23	*	*	1440-1972			
ARPA	Baja/C/Vallecito	JP	34/17	*	*	1563-1972	*		
ARPA	Baja/C/Tasajera	JP	32/16	*	*	1559-1973			
ARPA	Baja/C/Tasajera	WF	30/15	*	*	1663-1972	*		
ARPA	Baja/C/Tasajera	LD	30/15	*	*	1473-1972	*		
Naylor	Sierra Madre/Rio Verde Chihuahua	DF	26/13	*	*	1635-1973			
Jonsson	Muddas National Park, Sweden	SCP	42/21 additional	*	*	1530-1973	*		

JP-Jeffrey pine; Pnnq-Parry pinyon (Pinus quadrifolia); WF-White fir; LD-Incense cedar (Libocedrus decurrens); DF-Douglas fir; SCP-Scotch pine (Pinus sylvestris).

* Means this step accomplished since last report.

Task 2 reported by J. S. Dean. Collections in the Southwest Plateau Area.

The principal objective of Task 2 is the construction of a geographical network of tree-ring chronology stations throughout the plateau area of the Southwest in order to assess tree-growth-climate relationships and to isolate spatial and temporal patterns of variation in past climatic conditions in the region. The network of modern tree-ring stations corresponds to an already existing grid of tree-ring chronologies based on samples from archaeological sites. Dendroclimatic analyses of the modern tree-ring series will be used to calibrate the archaeological sequences with local climatic conditions as basis for more accurate reconstructions of past climatic variability in the Southwest. Those modern series that extend far enough back into the past will be merged with their archaeological counterparts to produce long-range chronologies suitable for detailed studies of past climatic conditions in the Southwest from A.D. 700 to the present.

During the past six months, two previously unsampled tree-growth sites in Arizona were collected to bring the total amount of material available to the Task 2 research project to 1612 cores from 801 trees representing 48 study sites in Arizona, New Mexico, Colorado, and Utah (Table 3). This work completes the field collection objectives of Task 2.

Laboratory study of the Task 2 collection is proceeding on schedule. Sample analysis was completed on material from 25 stations, and computer analysis of the data from five of these site collections is in progress. As of December, 1973, specimen analysis has been completed for 47 of the 48 sites. Twenty individual species chronologies from 15 sites have been constructed, and 6 additional dated species sets are in various stages of computer processing. Twelve of the modern chronologies constructed as part of the

Task 2 program are long enough to overlap with their archaeological counterparts to yield continuous chronologies that extend from the prehistoric past up to the 1970s. The areas for which we now have continuous chronological coverage are Tsegi Canyon, Hopi Mesas, and Flagstaff in Arizona, Natural Bridges in Utah, Mesa Verde in Colorado, and Gobernador, Cebolleta, Cibola, Jemez Mountains, Chama, Upper Rio Grande, and Santa Fe in New Mexico. This achievement is of great importance to the Task 2 research program.

Collection and collation of climatic data to be used in dendroclimatic studies of the relationships between modern tree growth and climate is presently continuing.

In summary, the Task 2 work is proceeding well toward completion of its role in ARPA collecting by the target date of June, 1974. The original network of archaeological chronology stations has been duplicated as closely as possible with the modern tree-growth sites, each of which corresponds to one of the prehistoric chronology stations. Laboratory work and computer processing is directed toward the development of the network of standardized tree-ring chronologies that will be used as the basis for specifying the relationships of tree growth to climate, which in turn provide the foundation for detailed reconstructions of climatic variability in the Southwest during the last 1500 years. These reconstructions to be made in Year 3 will provide an expanded basis for modeling possible future trends in Southwestern climate. Furthermore, the Task 2 tree-ring sequences will be incorporated into larger geographic chronology grids to provide paleoclimatic data on a continental and hemispherical scale.

TABLE 3

Progress of Task 2. Collections on the Southwest Plateau Area

SPONSOR	SITE NAME	SPECIES	CORES/ TREES	EXAMINED	DATING CHECKED	CHRON. LENGTH	MEASURED	DATA PROCESSED	SELECTED CORES/TREES
ARPA	Grasshopper, Arizona	PP	36/18	X	X	1641-1972	X	X	
ARPA	Salt River Draw, Ariz.	PP	21/10	X	X	1675-1972	X	X	
ARPA	Oak Creek, Arizona	PNN	30/15	X	X	1694-1972	X	X	
NPS+ ARPA	Spider Rock, Arizona	PNN	46/23	X	X	1601-1972	X	X	
NPS ARPA	Spider Rock, Arizona	DF	32/16	X	X	1598-1972	X	X	
NPS ARPA	Canyon de Chelly, Ariz.	DF	20/7	X	X	1375-1972	X	X	
ARPA	Tseh Ya Kin Canyon, Ariz.	DF	24/12	X	X	1500-1972	X	X	
NPS ARPA	Tsegi Point, Arizona	PNN	40/20	*	*	1411-1972	*		
NPS	Tsegi Point, Arizona	DF	14/7	X	X	1532-1971	X		
ARPA, NPS TRL+	Betatakin Canyon, Ariz.	DF	77/24	X	X	1382-1972	*		
NPS ARPA	Kinbiko Rim, Arizona	JUN	22/11	X		1672-1972			
NPS	Kinbiko Rim, Arizona	PNN	18/9						
TRL	Kiet Siel Canyon, Ariz.	DF	48/12	*	*	1688-1963	—	—	none
NPS	Northern Black Mesa, Ariz.	DF	12/6	X	X	1551-1968	X		

TABLE 3—continued.

SPONSOR	SITE NAME	SPECIES	CORES/ TREES	EXAMINED	DATING CHECKED	CHRON. LENGTH	MEASURED	DATA PROCESSED	SELECTED CORES/TREES
NPS	Northern Black Mesa, Az.	PP	16/8	X	X	1569-1968	X		
NPS	Northern Black Mesa, Az.	PNN	8/4	X	X	1600-1968	X	X	8/4
TRL	Dinnebito, Arizona	PNN	44/20	X	X	1470-1972	X	*	
ARPA	Shonto Plateau, Arizona	PNN	30/15	X	X	1369-1972	*		
ARPA	Show Low, Arizona	PP	30/15	*	*	1595-1972	*		
ARPA	Jack's Canyon, Arizona	PNN	30/15	*	*	1533-1972	*		
ARPA	Robinson Mt., Arizona	PP	30/15	*	*	1610-1972	*		
ARPA	Medicine Valley, Arizona	PP	30/15	X	*	1662-1972	*		
ARPA	White Horse Hills, Ariz.	PP	30/15	*	*	1658-1972	*		
ARPA	Hunting Station, Arizona	PNN	30/15	X	X	1688-1972	*		
ARPA	Slate Mt., Arizona	PP	24/12	*	*	1647-1972	*		
ARPA	Cross Canyon, Arizona	PP	31/15	X	X	1608-1973	X		
ARPA	Defiance Plateau, Ariz.	PNN	26/13	X	X	1596-1973	X		
ARPA	Navajo Mountain, Utah	PP	30/15	X	X	1566-1972	*	*	
ARPA	Navajo Mountain, Utah	PNN	26/13	X	X	1468-1972	*	*	
ARPA	Kane Spring, Utah	PNN	30/15	X	X	1444-1972	X	*	8
ARPA	White Canyon, Utah	DF	42/21	X	X	1346-1972	*	*	

TABLE 3—continued.

SPONSOR	SITE NAME	SPECIES	CORES/ TREES	EXAMINED	DATING CHECKED	CHRON. LENGTH	MEASURED	DATA PROCESSED	SELECTED CORES/TREES
USFS+	Elk Ridge, Utah	PNN	20/10	*	*	1275-1971	*		
USFS	Elk Ridge, Utah	JUN	10/5	*	*	1745-1971	*		
USFS	Devil's Canyon, Utah	PP	12/6	*	*	1572-1971			
MNA+	Cedar Mesa, Utah	PNN JUN	96 Sections	X	X	1491-1972	—	—	none
ARPA	Bobcat Canyon, Colorado	DF	24/12	X	X	1388-1972	X	X	
ARPA	Wetherill Mesa, Colorado	PNN	24/12	X	X	1611-1972	X	X	
ARPA	Wetherill Mesa, Colorado	JUN	16/8	X	X	1817-1972	—	—	none
ARPA	Pueblito Canyon, N. M.	DF	29/14	X	X	1651-1972	X	X	
ARPA	Ditch Canyon, New Mexico	DF	28/14	X	X	1657-1972	X	X	22/11
ARPA	Ditch Canyon, New Mexico	PP	28/14	X	X	1554-1972	X	X	
ARPA	Ditch Canyon, New Mexico	PNN	24/12	X	X	1574-1972	X	X	
ARPA	Ditch Canyon, New Mexico	JUN	24/12	X	X	1692-1972			
TRL	Aztec, New Mexico	DF	12/6	X	X	1542-1970	X	X	12/6
TRL	Aztec, New Mexico	JUN	12/6	X	X	1417-1970	X	X	12/6
ARPA	El Morro, New Mexico	PP	70/35	*	*	1535-1972			
ARPA	El Morro, New Mexico	PNN	40/20	*	*	1643-1972			
ARPA	Canyon Lobo, New Mexico	PNN	40/20	*	*	1612-1972	*		

TABLE 3—continued.

SPONSOR	SITE NAME	SPECIES	CORES/ TREES	EXAMINED	DATING CHECKED	CHRON. LENGTH	MEASURED	DATA PROCESSED	SELECTED CORES/TREES
NPS ARPA	Satan's Pass, New Mexico	DF	54/27	*	*	1423-1972	*		
NPS ARPA	Turkey Spring, New Mexico	PP	52/26	*	*	1594-1972	*		
NPS ARPA	Turkey Spring, New Mexico	PNN	40/20	*	*	1410-1972	*		
NPS ARPA	Fort Wingate, New Mexico	PNN	52/26	*	*	1476-1972			
ARPA	Mt. Taylor, New Mexico	PNN	40/20	*	*	1546-1972			
ARPA	Cebolleta, New Mexico	PNN	42/21	*	*	1660-1972			
ARPA	Agua Fria, New Mexico	PNN	40/20	*	*	1592-1972			
ARPA	Tajique Canyon, N. M.	PP	32/16	*		1694-1972			
ARPA	Tajique Canyon, N. M.	PNN	24/12	*		1655-1972			
ARPA	Paliza, New Mexico	PNN	28/14	*		1651-1972			
NPS ARPA	Echo Amphitheater, N. M.	DF	34/13	*					
ARPA	Glorieta Mesa, New Mexico	PNN	30/15	*		1554-1972			
ARPA	Ruidosa Ridge, New Mexico	DF	42/21	*		1689-1972			
ARPA	Ruidosa Ridge, New Mexico	PNN	30/15	*		1602-1972			
ARPA	Rito de los Frijoles, N.M.	PP	36/18	*		1716-1972			
ARPA	El Valle, New Mexico	PP	32/16	*		1709-1972			

PP-Ponderosa pine; PNN-Colorado pinyon pine; DF-Douglas fir; JUN-Juniper.
+NPS-National Park Service; TRL-Tree-Ring Laboratory; USFS-U. S. Forest Service; MNA-Museum of Northern Arizona.
*This step accomplished since last report.

Task 3a reported by M. A. Wiseman. Collections in northeastern, midwestern, southeastern United States, and Alaska.

Expansion of tree-ring collections into other areas of North America has proceeded successfully and according to schedule. The examination of these new collections has, however, been hampered by a shortage of dating personnel; but we anticipate an acceleration of the dating procedure in the next six-month period with the addition of another dendrochronologist on this task.

The polynomial option in our computer program noted in the last Technical Report is now perfected and in use.

Northeast. Collections from New England made in 1972 have resulted in three well-replicated chronologies extending into the 1600's which are now ready for use in climate reconstruction analyses (Table 4). Two additional collections from New York State provided by Dr. Thomas Siccama (Yale) in 1973 have been worked for the ARPA project and have progressed to the measurement stage. Only one tree in the latter set has rings formed prior to 1700.

Midwest and Southeast. Two of the collections, one from Lake Itaska and one from the Boundary Waters region of Minnesota made by Fritts in 1972 have progressed well into computer processing. These should be available in the near future. The third site, also from the Boundary Waters region, is entirely complete and ready for use (Table 4).

On the basis of dating quality and series length in the University of Chicago materials which were scanned in Spring 1973, several sites were re-collected for the ARPA project during July/August 1973 in Arkansas, Missouri, Tennessee, Illinois, and Oklahoma to update those sites pre-dating A.D. 1700.

(Those not extending to 1700 have been deleted from analysis since the last reporting.) As part of the same collection trip, additional virgin stands still remaining in the states visited were also sampled, some of which have proven to extend prior to the target date of 1700. All updated and new sites connected with Task 3a are listed by state in Table 4 with preliminary ring counts noted to indicate those which will be old enough to fit the needs of the project.

An anticipated difficulty in updating the older collections will be the development of dendrochronological and statistical criteria for testing similarity between the old and new data to be merged. Much time will be devoted to this problem in the coming 12 months.

Dating in the new eastern areas has required a slow and methodical procedure because there has been no previous work in these regions to supply reliable master chronologies or substantiation for cross-dating. In this initial stage we must proceed with tentative dating of several sites within given areas until the agreement among them is of fine enough quality to confirm final dating of each chronology. The rate of site dating and checking over the past six months has been on the order of one man-month per site. Assuming a small increase in this rate over the next six-month period as we become more familiar with the nature of eastern chronologies, we anticipate that a total of 15 individual sites will be dated and checked between January and June, 1974. This will leave a remainder of 3 important sites and a possible 12 additional contingency sites to be dated in the following fiscal year before work on any new collections is undertaken.

Alaska. Collections were made in an old-age hemlock stand in the vicinity of Prince William Sound, Alaska during August, 1973, with the help of Thomas Sheehy (U. S. Forest Service). Thus far these have produced a

chronology greater than 300 years in length. Prospects look favorable for gaining good dendroclimatological predictability in the Artic and subarctic regions with additional sampling in this sensitive region.

TABLE 4

Progress of Task 3a. Collections in northeastern, midwestern, southern United States, and Alaska.

SPONSOR	SITE NAME	SPECIES	CORES/ TREES	EXAMINED	DATING CHECKED	CHRON. LENGTH	MEASURED	DATA PROCESSED	SELECTED CORES/TREES
ARPA	Nancy Brook, New Hamp.	RS	36/18	X	X	1561-1972	X	X	30/14
ARPA	Livingston, New Hampshire	RS	31/15	X	X	1696-1972	X	X	
Siccama+	Camel's Hump, Vermont A, B, and C	RS	53/27	X	X	1635-1971	X	*	50/25
Siccama	Giant Ledge, New York	RS	22/11	*	*	1678-1972			
Siccama	Cornell Mt., New York	RS	20/10	*	*	1817-1972	—	—	none
ARPA	Seagull Lake area, Boundary Waters, Minn.	RP	58/30	X	*	1624-1971	*		
ARPA	Saganaga Lake area, Boundary Waters, Minn.	RP	117/63	X	X	1619-1971	X	*	42/21
ARPA	Itasca State Park, Minn.	RP	53/27	X	*	1672-1971	*		
U of C+	ARKANSAS								
U of C	A-Bo	WO	26	X		ca 1700-1940			
U of C	A-In	WO	27	X		ca 1640-1940			
U of C	A-Jo	WO	39	X		ca 1690-1940 (updated by 1973 collections)			
U of C	A-Mo	SLP	45	X		1676-1940 (updated by 1973 collections)			
U of C	A-Ne	WO	49	X		ca 1680-1940			
U of C	A-Po	SLP WO	44	X X		ca 1640-1940 (updated by 1973 collections) ca 1690-1940 (updated by 1973 collections)			
U of C	A-Pp	WO	61	X		1642-1940 (updated by 1973 collections)			

TABLE 4—continued.

SPONSOR	SITE NAME	SPECIES	CORES/ TREES	EXAMINED	DATING CHECKED	CHRON. LENGTH	MEASURED	DATA PROCESSED	SELECTED CORES/TREES
	MISSOURI								
U of C	Mo-Ct	WO	45	X		ca 1690-1940	(updated by 1973 collections)		
U of C	Mo-S	oak pine	106	X		ca 1715-1940 ca 1690-1940	(updated by 1973 collections) (updated by 1973 collections)		
	OKLAHOMA								
U of C	O-Cm	ERC	32	X		ca 1640-1940	(updated by 1973 collections)		
	TENNESSEE								
U of C	T-Wa	oak	25	X		ca 1715-1938	(updated by 1973 collections)		
ARPA 1973 COLLECTIONS									
	OKLAHOMA								
ARPA	Mount Scott	ERC	28/14			ca 314 rings	(update for O-Cm)		
	ARKANSAS								
ARPA	Salus/A	oak	32/17			ca 122 rings	(update for A-Jo)		
ARPA	Russellville/A Russellville/A	WO SLP	27/12 24/12	*		1695-1972	(update for A-Pp)		
ARPA	Big Brushy	SLP	40/20			ca 200 rings	(update for A-Mo)		
ARPA	Crystal Mountain	SLP	32/16			ca 196 rings	(update for A-Mo)		
ARPA	Brush Heap Mountain	WO	30/15			ca 263 rings	(update for A-Po)		

TABLE 4—continued.

SPONSOR	SITE NAME	SPECIES	CORES/ TREES	EXAMINED	DATING CHECKED	CHRON. LENGTH	MEASURED	DATA PROCESSED	SELECTED CORES/TREES
	TENNESSEE								
ARPA	Falls Creek Falls	oak	34/17			ca 290 rings	(update for T-Wa)		
	Falls Creek Falls	PV	26/13			ca 146 rings			
ARPA	Savage Gulf High	SLP	28/14			ca 274 rings			
	Savage Gulf Low	SLP	28/14			ca 195 rings			
ARPA	Clingman's Dome	BF	28/14			ca 220 rings			
ARPA	Steiners Woods	WO	14/7			ca 307 rings			
ARPA	Greenbriar Pinnacle	TMP	28/14			ca 140 rings			
ARPA	Norris Watershed Boundary	SLP	24/12			ca 328 rings			
ARPA	Wolf Pen Hollow	TMP	24/12			ca 152 rings			
	NORTH CAROLINA								
ARPA	Newfound Gap	RS	30/15			ca 270 rings			
	ILLINOIS								
ARPA	Ferne Clyffe/A	WO	20/10			ca 320 rings	(update for Estes data)		
	Ferne Clyffe/B	ERC	40/20			ca 230 rings			
	Ferne Clyffe/C & D	ERC	44/22			ca 106 rings			
	MISSOURI								
ARPA	Society American Foresters	WO	24/12	*	*	1723-1973	(update for Mo-S)		
ARPA	Mark Twain Nat'l Forest	WO	35/17			ca 193 rings	(update for Mo-Ct)		
	Mark Twain Nat'l Forest	SLP	38/19			ca 174 rings			
	ALASKA								
ARPA	Herring Alpine	HM	24/12	*	*	ca 1400-1972			

+Siccama-Dr. Thomas G. Siccama (Yale); U of C-University of Chicago Collection.
RS-Red spruce; RP-Red pine; WO-White oak; SLP-Shortleaf pine; ERC-Eastern red cedar; PV-Virginia scrib pine (Pinus virginia); BF-Balsam fir (Abies fraseri); TMP-Table Mountain pine (Pinus pungens); HM-Hemlock (Tsuga canadensis)
* This step accomplished since last report.

Task 3b reported by H. C. Fritts. International Cooperation.

In October, 1973, H. C. Fritts made the following personal contacts with European workers:

Professor A. Pons, Director, Laboratoire de Botanique Historique et Palynologie, Université de Provence, Marseille, France. Fritts participated on the doctorate committee of Mlle Serre, delivered two lectures, and visited pine sites in southern France. Prof. Pons stated that the visit had convinced him of the power of new multivariate methods and requested that he also be able to participate personally in the international collaboration program. Drs. Serre and Pons agreed to share their existing short-length chronologies and to launch on an extensive collection effort to obtain longer chronologies. Both plan to attend the workshop and visit the University of Arizona beforehand to prepare their data.

Professor dr. Karol Ermich, Director, Akademia Rolnicza, Kraków, Poland. Fritts was warmly received and presented his materials to Ermich and the local administrator of the Academy of Agriculture. Since Ermich has been one of the early leaders in dendroclimatology, he was quick to see the possibilities of the new multivariate work and the need for international cooperation. Prof. Ermich is near retirement with a heart condition, so he will send a young Ph.D., Zazistaw Bednarz, to the workshop in April if permission is granted by the Polish government. Appropriate letters have been sent to the authorities in Poland and informal agreements have been made to cooperate.

Professor Teodoras Bitvinskas, Director, Dendro-klimatochronologine laboratorija, Lietuvos TSR MA Botanikos instituto, Kaunas, Lithuania. This is a very impressive organization which is perhaps the next largest research group in dendrochronology to the Laboratory in Tucson. Fritts presented his lecture to the Lithuanian Academy of Science and then in an official meeting with them agreed to the principle of mutual sharing of data. Professor Bitvinskas and his interpreter then accompanied Fritts to Leningrad and participated in discussions there.

Professor Ye. P. Borisenkov, Director, Main Geophysical Laboratory, Leningrad, U.S.S.R. Fritts was warmly received by the climatologist and meteorologist and delivered his lecture, which was received enthusiastically. Discussions after the lecture centered around the various international programs and the possibilities where dendroclimatic analysis would be a significant contribution to the study of variations in past climatic states. Borisenkov decided to attempt to send one of his climatologists to the conference in Tucson this April.

Dr. N. V. Lovelius, Laboratory of the Far North, Komarov Botanical Institute, Leningrad, U.S.S.R. This was a visit to the Botanical Institute where agreements to share data were also made. Lovelius is sending a manuscript on his work to be published in English and plans to share his data. He also hopes to participate in the Tucson meeting, and appropriate invitations have been sent. While there, Fritts was asked and agreed to help Bitvinskas organize and chair a symposium on dendroclimatology at the International Botanical Congress to be held at the Botanical Institute in July of 1975.

Dr. Bengt Jonsson and Professor Gustaf Sirén, Royal College of Forestry, Stockholm, Sweden. This was a brief return visit where Fritts delivered a lecture, discussed some of the Swedish materials already collected for ARPA, and talked with Nigel Calder of the British Broadcasting Corporation regarding a documentary on climate.

After return to Tucson, word was received from workers behind the Iron Curtain that doors had opened up due to the recent visit.

At present only one out of twelve laboratories visited in Europe will be unable to participate in the Tucson conference. A total of 24 participants are now registered, which exceeds by four persons the number we originally expected to attend. At the time of the conference we hope to set up the International Data Bank and establish a working group that perhaps can become a part of an official international endeavor whenever the organization and mechanism are set up.

Copies of our computer routine for handling tree-ring data and the 49 basic chronologies have been mailed to all major laboratories as concrete evidence of our intention to collaborate.

Task 4 reported by C. W. Stockton. Climatic Data Bank.

Development of the climatic data bank had been expanded beyond the western state grid into coverage of the entire continental United States, portions of southwestern Canada and northern Mexico. We now have a tentative 96-station grid selected on the basis of: 1) length of record (both monthly precipitation and temperature), 2) completeness of record, 3) proximity to existing or contemplated tree-ring sites, and 4) spatial coverage necessary for reconstructions. However, many of these records still must be checked for homogeneity. With this selected grid of climatic records, we are now prepared to undertake our initial climatic reconstruction efforts. At the beginning stage we will not utilize the entire 96-station grid set but rather will use appropriately chosen subsets to correspond with our developing tree-ring site grid.

We have plans to continue our testing for homogeneity in these records and have sent copies of our 96-station grid to other climatologists for their appraisal. Hence, the final climatic grid should be selected by the end of this fiscal year.